

Application No. 09/003,925

Art Unit: 3762

REMARKS

In the Office Action mailed 27 April 2004 all pending claims 1-36 were rejected. In this Reply, no claims are canceled, no claims are amended and no new claims are presented. Thus, claims 1-36 are pending examination on the merits. For the convenience of the Examiner, originally submitted claims 1-36 are set forth hereinabove.

Rejections Under 35 U.S.C. §102(e) and 35 U.S.C. §103(a)

In the Office Action, claims 1, 3, 6-9 and 11-15 stand rejected under 35 USC §102(e) as being anticipated by a published patent application by Spillman (US2002/0155350 A1); claims 1, 3-11, 13, 14, 16, 18-25, 27, 29, 30, 32, 33, 35 and 36 stand rejected under 35 USC §102(e) as being anticipated by a published U.S. patent application by Frysz et al. (US2001/0055716 A1); claims 2, 17, 31 and 34 stand rejected under 35 USC §103(a) as being unpatentably obvious over Frysz et al. in view of Kyle (U.S. Pat. No. 4,514,207) and claims 26 and 28 stand rejected under 35 USC §103(a) as being unpatentably obvious over Frysz et al. in view of Spillman. These rejections are respectfully traversed.

On the basis of the previously submitted declaration, all the applied references, save Kyle, stand antedated. However, since Kyle alone did not form the basis of any rejection, but rather the Examiner based the rejection of claim 26 and 28 upon the combination of Kyle and Frysz et al. (which no longer can be utilized as competent prior art), the rejection cannot stand and should be properly withdrawn.

In support of the declaration (paper 10) filed pursuant to 37 CFR 1.131 on behalf of the Applicants to nullify the applied prior art vis-à-vis the pending claims. As noted by the Examiner, the declaration failed to form part of the declaration or their absence satisfactorily explained. Attached hereto for entry are photocopies of two (2) pages from laboratory book number 8959 which was issued to and maintained by William J. ("John") Taylor, an inventor of the subject

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matter claimed in the instant application. Applicants suggest that the Examiner attach the photocopies of the original records to the declaration (paper 10) as Applicants intended to include them with the submission of the declaration but inadvertently failed to do so.

Applicants respectfully assert that upon entry of the photocopied records that the prior art applied herein stands traversed and the pending claims should proceed to timely issuance as U.S. Letters Patent.

CONCLUSION

Applicants respectfully suggest that all presently pending claims 1-36 of the instant application are now in condition for allowance. Applicants respectfully request reconsideration and prompt allowance of said claims. Please charge any additional fees or credit any overpayment to deposit account number 13-2546.

The Examiner is invited to telephone the below-signed attorney to discuss this application.

Respectfully submitted,

25 June '04
Date

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om Page No. — Background

Primer is developing a lithium-ion battery for rechargeable purposes. The cathode is LiCoO_2 while the anode is Carbon-MCMB, all immersed in LiPF_6 electrolyte. Electrochemical studies have been conducted on various proposed anode metals. Because of the high voltage generated by this battery, titanium and particularly Ti-6Al-4V appear to be favorable anode materials. Ti-6Al-4V appearing to be equivalent in corrosion to the preferred anode material, Aluminum.

Idea:

To meet the corrosion requirements and the material packaging requirements of the lithium-ion rechargeable battery, the following feed is proposed.

Feedstock - Compacting 304L SST

Pin - Titanium, Titanium alloys with the preferred material being Ti-6Al-4V.

Sealing gas - Cathel-12

20 mole% CaO , MgO , Al_2O_3

40 mole% BaO

What the invention is designed to solve:

The invention is designed to allow the packaging of a feedthrough that can incorporate a Ti-6Al-4V pin for use in rechargeable Li-ion batteries.

Features of the invention that are believed to be novel:

Typically, glass-to-metal seals require similar coefficients of thermal expansion to minimize the formation of detrimental tensile stresses at such interfaces. Such tensile stresses can lead to either poor mechanical behavior of the glass-metal interface which can result in the inability to meet the helium leak rate requirement of the device. Hermeticity is a critical requirement in implantable medical devices as failure in this area can lead to premature battery depletion or leakage of electrolyte to the electronics of the device causing an abrupt stoppage of therapy to the patient.

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Invented & Understood by me,

ack Tardiff

Date

07 Oct 1999

Invented by

John Taylor

Date

07 Oct. 1999

Recorded by

The proposed invention violates this design rule in that the thermal expansion of the Ti and Ti-6Al-4V pins is approximately 10×10^{-6} in/in/°C, while that of the Coral-12 glass is approximately 6.8×10^{-6} in/in/°C. Typically coefficients of thermal expansion matches within 20% are required. The combination proposed represents a 47% difference.

The potential tensile stresses that can occur with the proposed design, are ~~can~~ mitigated by the use of an outer ring or ferrule comprised of 304L SS, which upon heating up is engaged by the Coral-12 Sealing Glass. During cooling, as the glass becomes a rigid body the 304L SS ferrule contracts at a rate faster than the Coral-12 glass, thereby placing it under a state of compression. Glasses are placed under a state of compression is not prone to fracture. In addition the oxide-oxide bond created between the Titanium, titanium alloy pin and Coral-12 glass, greatly improves the durability of the design. This is based upon extension of concept published by Sandia National Labs in document SAND-87-0541C DE88-00061 1987. In that ~~document~~ document, Sandia describes the improvement in pin/glass seal strength measured when using Titanium & titanium alloy pins with boron-aluminosilicate & boron-aluminosilicate glasses with strontium & barium. However, Sandia documents the use of glasses of this type with a comparable thermal expansion match with titanium.

The combination of materials proposed in this idea have been shown to meet or exceed the requirements of a perfect design. This is documented in notebook 9048, pages 88, 89 & 90 (Jack Tardiff).

Witnessed & Understood by me,

Date

Invented by

Recorded by

Date

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